THE ROLE OF THE LABORATORY IN FOOD LAW ENFORCEMENT.

A radio talk by J. O. Clarke, Food and Drug Administration, delivered through WRC and 38 other radio stations associated with the National Broadcasting Company, October 23, 1930.

Come with me to the Chicago laboratory of the Food and Drug Administration. We find ourselves surrounded by young men and women busily engaged with all sorts of mysterious-looking things. There are tubes, flasks, beakers, and other chemical apparatus, and there are innumerable bottles containing strange-looking liquids and powders. Scattered about the laboratory, are ovens, steam baths, electric furnaces, pumps, centrifuges, and all kinds of scientific paraphernalia. One of the most important things we see, is the delicate balance--scales so sensitive and accurate that one could use them to weigh the wing of a mosquito. But these chemists are not weighing mosquito wings and they are not engaged in solving abstruse scientific problems. They are analyzing the ordinary, every-day foods that you eat and the ordinary, every-day drugs that you purchase at the corner drugstore.

Let us talk to some of these men. We will find that they are glad to tell us about their work. The first man we approach, has before him a bottle of our old friend Iodine--or, as it is better known to the chemist, Tincture of Iodine. The chemist shows us some beautiful purple crystals and tells us that these are pure iodine, a very expensive substance. A tincture, to be effective, must contain not less than 6.5 grams or more than 7.5 grams of these crystals in each 100 c.c. of liquid--or, roughly, about 7.0%. If it contains much less than the correct amount, it would be useless to apply the tincture to the cut that Johnny received when he was playing with the kitchen knife. When this chemist gets through with his job, he can say with a high degree of accuracy just how much iodine this particular tincture contains. If he finds the right amount, that's fine for everybody. But if his analysis shows a deficiency of iodine, the Food and Drug Administration will make it very uncomfortable for the manufacturer.

We see on another table a bottle labeled, "Sam Smith's Malarial Remedy." The chemist is pouring some of this vile-smelling and tasting liquid into a glass vessel which looks somewhat like a large glass pear. He tells us that his job today is to find out how much quinine there is in "Sam Smith's Malarial Remedy." If he finds that it has enough quinine in it really to be useful in treating malaria, he will report that it is not misbranded. If it does not contain enough quinine, he will report that "Sam Smith's Malarial Remedy" must be seized because it would be of no value in treating Malaria and its sale as a treatment for Malaria would be illegal. We noticed that this chemist also has a little bottle of pills labeled "Strychnine 1/20 Grain," on his work bench. He expects to start work on this sample as soon as he finishes with "Sam Smith's Malarial Remedy." It will be his job to find out if each of the little pills contains 1/20 of a grain of strychnine so that the physician, when he wants to give a patient a 20th of a grain of strychnine, will be sure that the little pills each contain the proper amount of this potent medicine.

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We have been wandering around the drug laboratory thus far. Let us now go into the next room, which is called the food laboratory. The first chemist we meet is seated at one of the very delicate balances and is carefully weighing little dabs of butter into small aluminum dishes. This man is doing a comparatively simple job of chemistry and he can tell us all about it. He says that he weighs these small bits of butter into the dishes. He then places them in an oven where the water is driven off and weighs them again. From the loss in weight, he can calculate the exact amount of water in the sample of butter. A simple enough job when one knows how -- and something easy to explain to his visitors. He is unlike the chemists in the drug laboratory whose problems are quite complicated and who recognize that it would be futile to attempt to explain it in detail to their visitors.

We find another man in the food laboratory who is examining a sample of a golden-yellow powder. He tells us that this powder is dried egg and it is his job to find out if it was made with fresh eggs or rotten eggs. It looks all right and it smells all right whether it be made from fresh eggs or eggs that are not so fresh, but this young man is able to apply certain chemical tests and tell us just what kind of eggs were used in its manufacture. Most of you have never seen egg powder, but all of you have eaten it in cakes, noodles, pies, and other bakery products. Immense quantities, made mostly of fresh eggs, are imported from China and form a legitimate and proper ingredient in many of our prepared foods.

In another corner of the food laboratory, we find an attractive young lady who is intently looking into a microscope. She is skilled in the use of the microscope -- what we call a microscopist. She invites us to take a look into her instrument. We observe a circular field with lots of little particles of brownish material, irregular in shape and of varying structure, scattered about, along with a few small, egg-shaped, colorless bodies which appear to be about the size of a pin point. Our microscope expert explains that she is examining a sample of prepared mustard and that the little egg-shaped bodies are starch cells, showing that the so-called mustard is adulterated with starch. If a little iodine is added to the dab of adulterated mustard on the slide, the microscope reveals that each of the starch cells have been colored a beautiful purple. She takes another sample of mustard which she knows to be unadulterated, puts a drop of it on a slide and lets us take a look at the unadulterated mustard. It looks just like the adulterated product except that the egg-shaped particles are not to be found.

Suppose we leave the Chicago laboratory and visit one of the Food and Drug Administration's many laboratories in Washington. Here we find a young man, surrounded by many cages containing innumerable rats, guinea pigs, baby chicks, and other animals. He is examining a sample of a product labeled as containing vitamins. His desk is littered with charts and papers containing all sorts of curves and figures. We won't bother to find out what these curves and figures mean in detail. But the young man tells us that he feeds his animals with various combinations of food, some including the sample under test, and measures their growth, sometimes through several generations, to find out if the vitamin claims on the label are justified. In other words, to find out if the food actually does contain the vitamins that the label claims for it. This chemist does his work in the most direct way -- he feeds the sample to an animal and

notes the effect. Logical and clear-cut, because the food acts about the same way on the small laboratory animals as it will with human beings.

Let us wander into the bacteriological laboratory, where the tiniest animals of all -- bacteria -- are being studied. Bacteria are, in fact, so small that we don't exactly feel right when we call them animals. Here we see incubators, sterilizers, thousands of little tubes containing various kinds of solutions. We also find a bacteriologist who is carefully removing small portions of food from a can of beans. He tells us that in general canned food should not contain any ordinary living bacteria. So he is testing these canned beans to find out if they do contain living bacteria. This is done simply by putting a little of the food into a tube containing what the bacteriologist calls nutrient-media. This simply means a liquid, containing food on which the bacteria can live and thrive. If the bacteria are dead, naturally they cannot thrive and there is no growth in the tubes. If alive, they begin to multiply and after a day or two, the contents of the tube become cloudy and sometimes have a foul odor. Then comes the hardest part of the job, for the bacteria growth must be examined to find out what kind of bacteria it is. Some kinds are harmless -- others extremely poisonous. When the young man gets through with his job, he knows whether the organism, which is another name for bacteria, is alive; whether it is dangerous, and whether the food should be removed from the market.

The Food and Drug Administration of the United States Department of Agriculture employs a large corps of chemists, bacteriologists, microscopists, and other scientific workers, whose daily task is literally to tear to pieces samples of our food and drugs and find out how they are made and what they are made of. There are 17 of these laboratories located in the larger cities of Continental United States and on the Island of Porto Rico. There are elaborate laboratories in Washington, D. C., where scientists work along the same line.

I wanted to go into some detail and tell you how our scientific workers get their truly remarkable results. But this would take entirely too long, and I fear that before I was half through, most of my listeners would have gently escorted me out of their homes by the simple expedient of turning their radio dials. If any of you, however, are interested, we would be glad to have you visit our field laboratories or our main laboratories in Washington. Write to the United States Food and Drug Administration, 1625 Transportation Building, Chicago, Illinois, and we will be glad to arrange for you to visit the laboratory nearest your home.
